

精密源自用心  
创造成就超越

数控拉床 CNC BROACHING MACHINE



台州成春自动化设备有限公司  
TAIZHOU CHENGCHUN AUTOMATION EQUIPMENT CO., LTD.



▶▶ <http://www.tzccauto.com>

# Company

## 公司简介 profile

台州成春自动化设备有限公司，地处中国东南沿海之汽摩配之都——浙江玉环。是一家集研发、制造、销售、售后服务于一体的现代化数控装备制造新型企业。

我们依据雄厚的专业力量，结合自身的市场定位，开发出一系列高端、高精、自动化生产设备——全数字交流伺服拉床、全自动数控拉床、全自动螺旋拉床、液压拉床等产品。各有5吨——100吨各系列机床。经过我们的特殊设计，成春设备系列产品具备高精度、低噪音、稳定性好、易于安装和外型美观等特点，以其生产效率高、成本低、操作方便、安全性高、易于维护等优势，产品畅销国内外。

公司秉承“质量第一、用户至上、诚信经营、服务优良”为企业宗旨，以“精密源自用心，创造成就超越”为企业根基，听市场之音而定产品之位，视品质卓越为第一生命，时刻关注每个员工对产品质量意识的认识和提高，为顾客提供满意的产品和优质的售后服务，同时不断创新和开发新产品，不断开拓新的业务领域，热忱欢迎海内外客户和各界人士光临指导、洽谈贸易、合作共赢！



Taizhou Chengchun Automation Equipment Co., Ltd. is located in Yuhuan, Zhejiang Province, the capital of automobile and motorcycle accessories along the southeast coast of China. Is a research and development, manufacturing, sales, after-sales service in one of the modern CNC equipment manufacturing enterprises.

We have developed a series of high-end, high-precision and automatic production equipment – full digital AC servo broaching machine, full-automatic CNC broaching machine, full-automatic spiral broaching machine, hydraulic broaching machine and so on. Each has 5 tons – 100 tons of various series of machine tools. Through our special design, Chengchun equipment series products have the characteristics of high precision, low noise, good stability, easy installation and beautiful appearance. With its high production efficiency, low cost, easy operation, high safety, easy maintenance and other advantages, the products sell well at home and abroad.

Adhering to the tenet of "Quality First, Customer First, Honest Management, Excellent Service", the company takes "Precision Originates from Intention, Creating Achievement Beyond" as its foundation, listens to the voice of the market to determine the position of the product, regards quality excellence as its first life, and pays close attention to every employee's understanding and improvement of product quality consciousness at all times. Customers to provide satisfactory products and quality after-sales service, while constantly innovating and developing new products, constantly opening up new business areas, warmly welcome customers at home and abroad and people from all walks of life to guide, negotiate trade, win-win cooperation!







成春设备



公司研发专利  
COMPANY PATENTS

# PATENT

成绩 · 是我们前进的动力

团结 · 拼出一个精彩

共赢 · 拼出一个未来

Achievement is our driving force.

Unite and make a wonderful performance.

Win win and spell out a future.





## 拥有世界顶级的拉刀和拉床 拉削加工

拉削加工是一种能够将需要滚齿机、插齿机和铣床等进行组合加工的零件在短时间内加工出来的加工方法。并且，由于能够使加工精度稳定在很高水平，所以广泛用于汽车制造业等各种产业领域。另外，这种加工方法还被用于发电机制造业和飞机制造业所使用的涡轮盘之类难切削材料的高精度加工，作为现代产业不可缺少的一种加工法倍受瞩目。

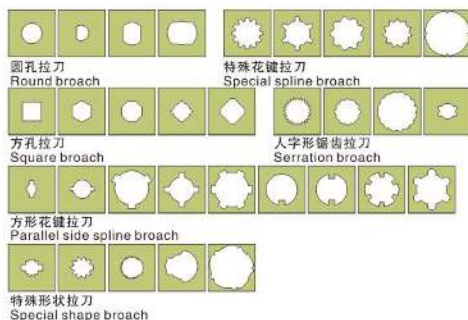
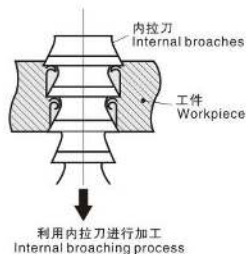
### 拉削加工的特点 Broaching features

- 能在短时间内加工完成，实现高效生产
- 稳定的高加工精度
- 只要在轴向上相同，即使是复杂且不规则的加工面也能够进行加工
- 良好的精修面
- 极为经济的加工方法
- 不需要熟练的加工技术
- Achieve high-performance through shorter work time
- High-precision machining that is stable
- Complex and irregular machining surfaces are possible as long as the axes coincide
- Superior finished surfaces
- Extremely economical machining method
- Skilled labor not needed for machining

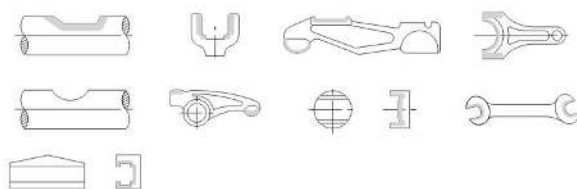
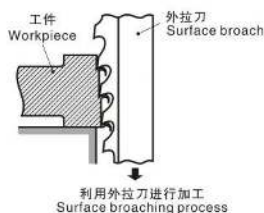


### 性能和加工例 Performance

#### [内拉削加工例]



#### [平面拉削加工例]



## 全自动伺服下拉式拉床的特点 Characteristics of Full automatic servo pull-down broaching machine

- 此机床下拉式结构；
  - 采用德国进口直线导轨、丝杆、轴承，稳定性可靠、效率高；
  - 采用低噪音式振动盘上料，产品可进行全自动检测。
- The machine tool has a pull-down structure;
  - It adopts linear guide rail, screw rod and bearing imported from Germany, with reliable stability and high efficiency;
  - Low noise vibrating plate is used for feeding, and the product can be tested automatically.



## 加工例 Sample



		CCLC-5T-SF-ZDXL	CCLC-10T-SF-ZDXL	CCLC-15T-SF-ZDXL
拉力 (KN)	Pulling force	50	100	150
最大行程 (mm)	Max. stroke	800	1000	1200/1400
切削速度 (m/min,60Hz)	Cutting speed	1-8	1-8	1-8
回程速度 (m/min,60Hz)	Return speed	15	15	15
拉刀升降装置行程 (mm)	Broach lifter stroke	600	600	600
垫孔径 (mm)	Bolster hole diameter	100	120	150
工件最大直径 (mm)	Max. workpiece dia	200	200	260
主电动机 (kW)	Main motor	11	15	22
机器高度 (mm)	Machine height	4000	4500	5000
占地面积 (mm × mm)	Floor space	1500 X 3000	1500 X 4000	2500 X 4500
机器重量 (t)	Weight	3.5	4.5	8

## 10吨单工位数控拉床的特点 Characteristics of 10T single position CNC broaching machine

- 构造简单，节省空间的内位床；
  - 同于此可移动式拉床无需地坑且不使用液压，所以小型，节省空间；
  - 通过高速化，切削状态的自动调整，对应柔性制造系统
- Internal broaching machine has simple construction and saves space.
  - Hydraulics are not used in this pit-free table-up type.
  - Compact, space-saving ATC. Automated setting of cutting conditions helps respond to FMS requirements.



## 加工例 Sample



		CCLC-10T-SF/1	CCLC-20T-SF/1
拉力 (KN)	Pulling force	100	200
最大行程 (mm)	Max. stroke	1200	1800
切削速度 (m/min,60Hz)	Cutting speed	0-15	0-15
回程速度 (m/min,60Hz)	Return speed	20	20
拉刀升降装置行程 (mm)	Broach lifter stroke	1000	1000
垫孔径 (mm)	Bolster hole diameter	100	150
主电动机 (kW)	Main motor	25	80
机器高度 (mm)	Machine height	4500	6500
占地面积 (mm × mm)	Floor space	1600x3000	1800x5000
机器重量 (t)	Weight	8	15



## 全自动双工位伺服下拉式拉床的特点 Characteristics of automatic double station servo pull down broaching machine

- 清洗烘干一体机，可解决加工面残留的污渍；
  - 重切削表面加工机床；
  - 表面加工专用的高效率拉床；
  - 利用各种夹具和工作台，实现加工的多样化；
  - 利用高刚性，长期维持高精度。
- Cleaning and drying machine can solve the residual stains on the processing surface;
  - Heavy cutting surface machining machine;
  - High efficiency broaching machine for surface processing;
  - Various fixtures and worktables are used to realize the diversification of machining;
  - High rigidity is used to maintain high precision for a long time.



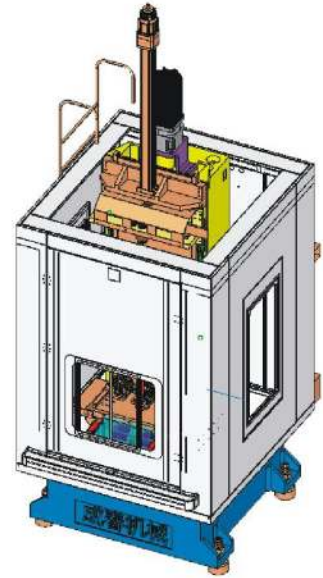
## 加工例 Sample



		CCLC-5T-SF/2	CCLC-10T-SF/2
拉力 (KN)	Pulling force	50	100
最大行程 (mm)	Max. stroke	800	1200
切削速度 (m/min,60Hz)	Cutting speed	0-15	0-15
回程速度 (m/min,60Hz)	Return speed	20	20
拉刀升降装置行程 (mm)	Broach lifter stroke	600	1000
垫孔径 (mm)	Bolster hole diameter	80	100
主电动机 (kW)	Main motor	7.5	25
机器高度 (mm)	Machine height	3000	4500
占地面积 (mm × mm)	Floor space	3000x2500	5000x4000
机器重量 (t)	Weight	5	10

## 螺旋拉床的特点 Characteristics of helical broaching machines

- 即使螺旋花键的规格不同或是直齿花键加工，也可以自由切换  
通过和选配件高速化装置的组合，能够实现自动生产线的柔性生产；
- 小型减速机、两轮车离合器的内螺旋齿轮的高效率加工；
- 利用紧凑设计实现节省空间。
- Flexible production on automated production lines is possible through a combination with the optional ATC which makes it easy to switch between helical splines and straight gear splines with different specifications.
- High-performance machining of compact reduction gears and internal helical gears for motorcycle clutches.
- Compact design reduces space requirements.



## 加工例 Sample



		CCLC-LX-T5	CCLC-LX-T10	CCLC-LX-T20
拉力 (KN)	Pulling force	50	100	200
最大行程 (mm)	Max. stroke	600/800	1000/1200	1400/1600
切削速度 (m/min,60Hz)	Cutting speed	0-10	0-10	
回程速度 (m/min,60Hz)	Return speed	20	20	15
拉刀升降装置行程 (mm)	Broach lifter stroke	600	600	600
垫孔径 (mm)	Bolster hole diameter	100	100	200
工件最大直径 (mm)	Max. workpiece dia	120	150	300
螺距控制方式 (mm)	Lead control	数字控制	数字控制	数字控制
主电动机 (kW)	Main motor	7.2/11	30	双15x2
机器高度 (mm)	Machine height	4000	4500	5500
占地面积 (mm × mm)	Floor space	1800x3000	2000x4000	2000x5000
机器重量 (t)	Weight	5	8	12

## 硬拉床的特点 Characteristics of hard drawing machines

- 切削速度为1 ~ 60m/min。适应硬式拉刀的最佳加工条件50 ~ 60m/min;
  - 通过线性滚子导轨和高刚性的特殊滚珠丝杆，确保高速驱动时的可靠性;
  - 根据刚性解析，对机器主体、工作台进行优化设计;
  - 采用工件移动式，降低工件安装高度，提高作业效率;
  - 无液压系统实现了节省能源、节省空间。
- Cutting speed 1-60m/min. Supports most suitable machining condition 50-60m/min a hard broach.
  - Secure reliability in high-speed drive with ball screw and linear roller guide.
  - Rigidity analysis used to optimize design of main unit and worktable.
  - Adjustable worktable improves productivity by lowering height of mounted workpieces.
  - Hydraulic components eliminated to save energy and space.



## 加工例 Sample



		CCLC-GS-5T-SF	CCLC-GS-10T-SF
拉力 (KN)	Pulling force	50	100
最大行程 (mm)	Max. stroke	800	1000
切削速度 (m/min,60Hz)	Cutting speed	1-60	1-60
回程速度 (m/min,60Hz)	Return speed	20	20
拉刀升降装置行程 (mm)	Broach lifter stroke	600	600
垫孔径 (mm)	Bolster hole diameter	100	150
工件最大直径 (mm)	Max. workpiece dia	150	200
主电动机 (kW)	Main motor	42	70
机器高度 (mm)	Machine height	4000	4500
占地面积 (mm × mm)	Floor space	2000 X 4000	2000 X 5000
机器重量 (t)	Weight	5	8



## 双丝杆大吨位伺服拉床的特点 Characteristics of double wire rod large tonnage servo broaching machines

- 通用我司自行设计双丝杆对称设计，可以承受更大的拉力，吨位30-100吨；
- 能够多轴的大批量生产用；
- 能够经受繁重切削的高刚性。
- General design of our company is self designed double wire rod symmetrical design, which can withstand greater pulling force and tonnage of 30-100 tons.
- Mass production using multiple axe.
- High-rigidity to handle extreme work conditions.



## 加工例 Sample



		CCLC-30T-SF/2	CCLC-60T-SF/2
拉力 (KN)	Pulling force	300	600
最大行程 (mm)	Max. stroke	1000/2000	1800/2200
切削速度 (m/min,60Hz)	Cutting speed	0-10	0-10
回程速度 (m/min,60Hz)	Return speed	15	15
拉刀升降装置行程 (mm)	Broach lifter stroke	800	800
垫孔径 (mm)	Bolster hole diameter	200	200
工件最大直径 (mm)	Max. workpiece dia	300	400
主电动机 (kW)	Main motor	22 X 2	30 X 2
机器高度 (mm)	Machine height	5200	6000
占地面积 (mm x mm)	Floor space	3000X6000	4000 X 7000
机器重量 (t)	Weight	12	20



## 液压拉床的特点 Characteristics of hydraulic press machines

- 切削速度为1~60m/min。适应硬式拉刀的最佳加工条件50~60m/min;
  - 通过线性滚子导轨和高刚性的特殊滚珠丝杆, 确保高速驱动时的可靠性;
  - 根据刚性解析, 对机器主体、工作台进行优化设计;
  - 采用工件移动式, 降低工件安装高度, 提高作业效率;
  - 无液压系统实现了节省能源、节省空间。
- Cutting speed 1-60m/min. Supports most suitable machining condition 50-60m/min a hard broach.
  - Secure reliability in high-speed drive with ball screw and linear roller guide.
  - Rigidity analysis used to optimize design of main unit and worktable.
  - Adjustable worktable improves productivity by lowering height of mounted workpieces.
  - Hydraulic components eliminated to save energy and space.



## 加工例 Sample



		CCLC-5T-YY	CCLC-10T-YY	CCLC-15T-YY
拉力 (KN)	Pulling force	50	100	150
最大行程 (mm)	Max. stroke	800	1000	1200/1400
切削速度 (m/min,60Hz)	Cutting speed	1-8	1-8	1-8
回程速度 (m/min,60Hz)	Return speed	15	15	15
拉刀升降装置行程 (mm)	Broach lifter stroke	600	600	600
垫孔径 (mm)	Bolster hole diameter	100	120	150
工件最大直径 (mm)	Max. workpiece dia	200	200	260
主电动机 (kW)	Main motor	11	15	22
机器高度 (mm)	Machine height	4000	4500	5000
占地面积 (mm × mm)	Floor space	1500 X 3000	1500 X 4000	2500 X 4500
机器重量 (t)	Weight	3.5	4.5	8

## 卧式数控端面拉床的特点 Characteristics of horizontal CNC end face broaching machine

- 重切削表面加工机床；
  - 表面加工专用的高效率拉床；
  - 利用各种夹具和工作台，实现加工的多样化；
  - 利用高刚性，长期维持高精度。
- 
- Heavy-duty surfacing machine.
  - High-performance broaching machine for surfacing.
  - Wide variety of operations using jigs and tables.
  - High rigidity maintains great accuracy over the long term.



## 加工例 Sample



		CCLC-T10-SF
拉力 (KN)	Pulling force	150
最大行程 (mm)	Max. stroke	1400
切削速度 (m/min,60Hz)	Cutting speed	0-15
回程速度 (m/min,60Hz)	Return speed	20
滑枕宽度	Ram width	400x1000
主电动机 (kW)	Main motor	26
机器高度 (mm)	Machine height	1700
占地面积 (mm × mm)	Floor space	2600x4500
机器重量 (t)	Weight	8



## 双工位数控立式端面拉床的特点 Characteristics of double position CNC vertical end face broaching machine

- 一次两只产品同时加工，可大大提高工作效率；
  - 重切削表面加工机床；
  - 表面加工专用的高效率拉床；
  - 利用各种夹具和工作台，实现加工的多样化；
  - 利用高刚性，长期维持高精度。
- Two products can be processed at the same time, which can greatly improve the work efficiency;
  - Heavy-duty surfacing machine.
  - High-performance broaching machine for surfacing.
  - Wide variety of operations using jigs and tables.
  - High rigidity maintains great accuracy over the long term.



## 加工例 Sample



		CCLC-T20-SF-WL/2
拉力 (KN)	Pulling force	200
最大行程 (mm)	Max. stroke	1600
切削速度 (m/min,60Hz)	Cutting speed	0-15
回程速度 (m/min,60Hz)	Return speed	20
滑枕宽度	Ram width	400x1000
主电动机 (kW)	Main motor	80
机器高度 (mm)	Machine height	5000
占地面积 (mm × mm)	Floor space	3500x4000
机器重量 (t)	Weight	20

## 全自动双工位螺旋拉床的特点 Characteristics of automatic double position screw broaching machine

- 即使螺旋花键的规格不同或是直齿花键加工，也可以自由切换；
- 通过和选配件高速化装置的组合，能够实现自动生产线的柔性生产；
- 小型减速机、两轮车离合器的内螺旋齿轮的高效率加工；
- 利用紧凑设计实现节省空间；
- 三种模式可任意选择，左旋、右旋、直齿；
- 设备新增双螺旋特点，可更好地解决齿面的光洁度。
- Even if the specification of spiral spline is different or straight spline is machined, it can be switched freely;
- The flexible production of the automatic production line can be realized by the combination of the high-speed device of the optional parts;
- High efficiency machining of internal spiral gear of small reducer and two wheel vehicle clutch;
- Space saving with compact design;
- Three modes can be selected at will: left rotation, right rotation and straight tooth;
- The new double helix feature of the equipment can better solve the surface finish.



## 加工例 Sample



		CCLC-LX-T5-ZD
拉力 (KN)	Pulling force	50
最大行程 (mm)	Max. stroke	1000
切削速度 (m/min,60Hz)	Cutting speed	0-10
回程速度 (m/min,60Hz)	Return speed	20
拉刀升降装置行程 (mm)	Broach lifter stroke	600
垫孔径 (mm)	Bolster hole diameter	80
螺距控制方式 (mm)	Lead control	数字控制
主电动机 (kW)	Main motor	7.2/11
机器高度 (mm)	Machine height	4000
占地面积 (mm × mm)	Floor space	1800x3000
机器重量 (t)	Weight	5

# 半自动双工位螺旋拉床

Semi automatic double position screw broaching machine



## 半自动双工位螺旋拉床的特点 Characteristics of semi automatic double position screw broaching machine

- 即使螺旋花键的规格不同或是直齿花键加工，也可以自由切换；
- 通过和选配件高速化装置的组合，能够实现自动生产线的柔性生产；
- 小型减速机、两轮车离合器的内螺旋齿轮的高效率加工；
- 利用紧凑设计实现节省空间；
- 三种模式可任意选择，左旋、右旋、直齿；
- 可根据产品需求，此设备可使用双螺旋拉刀。
- Even if the specification of spiral spline is different or straight spline is machined, it can be switched freely;
- The flexible production of the automatic production line can be realized by the combination of the high-speed device of the optional parts;
- High efficiency machining of internal spiral gear of small reducer and two wheel vehicle clutch;
- The compact design is used to save space;
- Three modes can be selected at will, including left rotation, right rotation and straight tooth;
- According to product requirements, this equipment can use double screw broach.



## 加工例 Sample



		CCLC-LX-T5-ZD
拉力 (KN)	Pulling force	50
最大行程 (mm)	Max. stroke	1000
切削速度 (m/min,60Hz)	Cutting speed	0-10
回程速度 (m/min,60Hz)	Return speed	20
拉刀升降装置行程 (mm)	Broach lifter stroke	600
垫孔径 (mm)	Bolster hole diameter	80
螺距控制方式 (mm)	Lead control	数字控制
主电动机 (kW)	Main motor	7.2/11
机器高度 (mm)	Machine height	4000
占地面积 (mm × mm)	Floor space	2000x2000
机器重量 (t)	Weight	5



## 20吨双工位伺服立式拉床的特点 Characteristics of 20T double position servo vertical broaching machine

- 低能耗，低噪音，高效率，同比传统液压拉床节能70%；
  - 重切削表面加工机床；
  - 表面加工专用的高效率拉床；
  - 利用各种夹具和工作台，实现加工的多样化；
  - 利用高刚性，长期维持高精度。
- Low energy consumption, low noise, high efficiency, 70% energy saving compared with traditional hydraulic broaching machine;
  - Heavy cutting surface machining machine;
  - High efficiency broaching machine for surface processing;
  - Various fixtures and worktables are used to realize the diversification of machining;
  - High rigidity is used to maintain high precision for a long time.



## 加工例 Sample



		CCLC-T20-SF
拉力 (KN)	Pulling force	200
最大行程 (mm)	Max. stroke	1800
切削速度 (m/min,60Hz)	Cutting speed	0-15
回程速度 (m/min,60Hz)	Return speed	20
垫孔径 (mm)	Bolster hole diameter	140
主电动机 (kW)	Main motor	90
机器高度 (mm)	Machine height	5500
占地面积 (mm × mm)	Floor space	2000x2500
机器重量 (t)	Weight	15

## 拉刀切削负荷的计算

预想负荷 (kgf) = 切削宽度 (mm) × 1 刃的切深 (mm)  
 × 单位面积切削阻力 (kgf/mm<sup>2</sup>)  
 × 同时切削刃数

安全负荷 (kgf) = 1.8 × 预想负荷 (kgf)

- 预想负荷是拉刀在普通状态下加工时所必需的切削力。
- 随着拉刀刀刃的不断磨损，就需要逐渐加大切削力，但加大到一定程度后拉刀会破损，或者因拉床的维护状态不良而在切削中停机。安全负荷就是指为了防止出现上述情况的允许切削力。

## 切削负荷计算例

各花键拉刀：φ20 × φ16 × 4 × NT6

耐热钢，切削长度 = 25mm

- 节距 = 7.5
- 同时切削刃数 = 25/7.5 = 3.3 → 4
- 1刃的切深（离表面）= 25 μm
- 预想负荷 = (4 × 6) × 0.025 × 0.4 × 4 = 1ton
- 安全负荷 = 1 × 1.8 = 1.8ton

## Calculation of pulling force

Expected force (kgf) = Cutting width × Cutting depth /  
 1 tooth (mm) × specific cutting  
 resistance (kgf.mm<sup>2</sup>) × Number  
 of simultaneous cutting teeth

Safety load (kgf) = 1.8 × Expected force

- Expected force means the necessary cutting force for broaching under normal conditions.
- Safety load is the permitted cutting force

## Example of calculation

Square spline broach : φ20 × φ16 × 4 × NT6

Heat resisting steel, cutting length = 25mm

- Pitch = 7.5
- Number of simultaneous cutting teeth = 25/7.5 = 3.3 → 4
- Cutting depth / 1 tooth (show below) = 25 μm
- Expected force = (4 × 6) × 0.025 × 0.4 × 4 = 1ton
- Safety load = 1 × 1.8 = 1.8ton

加工件的材料 Material	每1刃的切深 (单边) ( μ m ) Cutting depth / 1 tooth ( one side ) ( μ m )			单位面积切削阻力 Specific cutting resistance ( kgf/mm <sup>2</sup> )
	圆 Round	花键 Spline	平面 Surface	
合金钢 Alloy steel	10 ~ 20	25 ~ 30	30 ~ 70	300 ~ 400
软铁 Steel	10 ~ 20	25 ~ 35	30 ~ 70	300
铸铁 Cast iron	25 ~ 40	25 ~ 40	50 ~ 75	200
可锻铸铁 Malleable cast iron	25 ~ 35	25 ~ 35	50 ~ 75	150 ~ 200
轻合金 Light alloy metal	25 ~ 35	30 ~ 40	60 ~ 100	100 ~ 200

## 拉刀全长和拉床行程的关系

拉刀的长度要受到拉床的行程及夹具的限制。

- 拉刀刃长 + 后部柄长 (MAX) = ( 最大行程 )  
 - ( 切削长度 )
- 所需行程 = 刃长 + 后部柄长 + 切削长度  
 < 拉床最大行程

## Broach cutter length and machine stroke

Broach length is limited by machine stroke and jig / fixture.

- Broach cutter teeth length + Length of rear end shank (Max)  
 = (Max stroke) - (Cutting length)
- Necessary stroke = Teeth length + Length of rear shank +  
 Broaching length < Machine max stroke



成春设备

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